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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/955,712	09/19/2001	Vladimir M. Shalaev	37000-0015	1002

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EXAMINER
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LAVARIAS, ARNEL C

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 09/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/955,712

Applicant(s)

SHALAEV ET AL.

Examiner

Arnel C. Lavarias

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-71 is/are pending in the application.
- 4a) Of the above claim(s) 2-13, 25, 26, 28, 29, 32-35 and 49-58 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 14-24, 27, 30, 31, 36-48 and 59-71 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

1. The amendments to the specification of the disclosure in Paper No. 12, dated 6/27/03, are acknowledged and accepted. In view of these amendments, the objections to the specification in Section 3 of Paper No. 11, dated 3/31/03, are respectfully withdrawn.
2. The addition of Claims 61-71 in Paper No. 12, dated 6/27/03, is acknowledged and accepted.

### ***Election/Restrictions***

3. The Examiner notes that newly added Claims 61-71 are drawn to the elected invention, i.e. Invention III (See Paper No. 9, dated 1/8/03 and Paper No. 10, dated 2/6/03. Hence, newly added Claims 61-71 will be examined along with the elected invention.

### ***Response to Arguments***

4. The declarations under 37 CFR 1.132 filed 6/27/03 in Paper No. 12 are sufficient to overcome the rejection of Claims 1, 14-24, 27, 30-31, 36-48, 59-60 based upon 35 U.S.C. 102(a) and 103(a). The rejections in Sections 4-8 in Paper No. 11, dated 3/31/03, are respectfully withdrawn.
5. Claims 1, 14-24, 27, 30-31, 36-48, 59-71 are rejected as follows.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 19-20, 22-23, 30-31, 43-44, 46-47 are rejected under 35 U.S.C. 102(b) as being anticipated by Shalaev et al. (V. M. Shalaev, A. K. Sarychev, 'Nonlinear optics of random metal-dielectric films', Phys. Rev. B, vol. 57, no. 20, 5/15/1998, pp. 13265-13288), of record.

Shalaev et al. discloses an optical enhancing material comprising a medium, the medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters at approximately their percolation threshold (See Sections 1-2) and a light source incident on the medium (See Section 4) for performing harmonic generation of a signal. Shalaev et al. additionally discloses an optical switch comprising a medium, the medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters at approximately their percolation threshold; a light source incident on the medium, and a layer of optical switching material in the form of particles (See Section IV.A).

8. Claims 1, 59-60 are rejected under 35 U.S.C. 102(b) as being anticipated by Liao et al. (H. B. Liao, R. F. Xiao, H. Wang, G. K. L. Wong, 'Large third order optical nonlinearity in Au:dielectric composite films in femtosecond time scale', International Quant. Electr. Conference, vol. 7, San Francisco, 5/3-8, 1998, pp. 87-88.).

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Liao et al. discloses a sub-femtosecond pulse generation device comprising a medium, the medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters at approximately their percolation threshold (See Pages 87-88); a light source incident on the medium (See Page 88); and one or more near-field detectors of light emitted from the medium (See Page 88).

9. Claims 1, 43-44, 46-47 are rejected under 35 U.S.C. 102(b) as being anticipated by Sarychev et al. (A. K. Sarychev, V. A. Shubin, V. M. Shalaev, 'Percolation-enhanced nonlinear scattering from metal-dielectric composites', Phys. Rev. B, vol. 59, no. 6, 6/1999, pp. 7239-7242), of record.

Sarychev et al. discloses an optical switch comprising a medium, the medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters at approximately their percolation threshold (See Page 7239); a light source incident on the medium (See Page 7239), and a layer of optical switching material in the form of particles (See Page 7239).

### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 19-20, 22-23, 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shalaev et al.

Shalaev et al. discloses the invention as set forth above, except for one or more detectors of light emitted from the medium, the detectors detecting the harmonic generation signal. It is extremely well known in the art that one skilled in the art would utilize some type of radiation detector to detect optical harmonically generated signals. One would be motivated to do this to obtain amplitude information regarding the presence and amount of optical harmonically generated light produced by the percolating film.

12. Claims 14-18, 21, 24, 27, 36-42, 45, 48, 61-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shalaev et al. and Liao et al. in view of Kim et al. (W. Kim, V. M. Shalaev, R. L. Armstrong, V. P. Safonov, 'Giant coupled, multiplicative enhancement of optical emissions from fractal aggregate/microcavity composites', Quant. Electr. Laser Science Conf., Baltimore, 5/23-28, 1999, pp. 25.).

Shalaev et al. and Liao et al. discloses the invention as set forth above, except for the material additionally comprising a microcavity or microresonator made of one or materials selected from the group consisting of dielectric and semiconductor materials; the microcavity being selected from the group consisting of spheres, deformed spheres, spheroids, rods, and tubes; the microcavity being a semiconductor laser cavity; the medium being located at one or more surfaces of the microcavity selected from the group consisting of inner and outer surfaces; and the medium being an integrated component of the microcavity. Kim et al. discloses the use of fractal aggregate films in microcavities (See Page 25) wherein lasing emission was experimentally verified utilizing Rhodamine 6G embedded in silver fractal aggregates inside a cylindrical cavity. Since fractal

aggregate films and random metal-dielectric films (i.e. percolation composite films) are extremely similar, it would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the fractal aggregate film with a random metal-dielectric films (i.e. percolation composite films), and have the film additionally comprise a microcavity or microresonator made of one or materials selected from the group consisting of dielectric and semiconductor materials; the microcavity be selected from the group consisting of spheres, deformed spheres, spheroids, rods, and tubes; the microcavity be a semiconductor laser cavity; the film be located at one or more surfaces of the microcavity selected from the group consisting of inner and outer surfaces; and the film be an integrated component of the microcavity, as taught by Kim et al., for the purposes of enhancing the resonance response and optical nonlinear properties of laser gain media, thus reducing the required concentrations and pumping requirements for these laser gain media.

### *Conclusion*

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arnel C. Lavarias whose telephone number is 703-305-4007. The examiner can normally be reached on M-F 8:30 AM - 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 703-305-0024. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

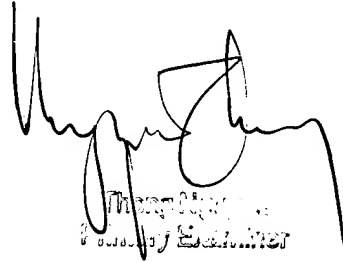
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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1782.



Arnel C. Lavarias  
9/5/03



Mary Schmitt  
Receptionist